the metabolic rate be determined. The approved sugar tolerance test should be carried out in all cases of acromegaly with a view of determining the state of both the pituitary and the thyroid function. Nothing of special significance bearing upon the etiological factors of the disease under consideration resulted from our studies, with the possible exception of the facts developed in connection with the age groups by decades (*vide* Table V). Our grateful acknowledgements are made to Dr. Andrew A. Anders for valuable assistance in the literary investigations.

EPILEPTOID OR FAINTING ATTACKS IN HYPOPITUITISM.[1]

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We shall make no attempt to analyze hypophyseal dysfunctions in their relationship to epileptiform seizures. This has been fairly well done by Cushing, Johnston and others. Nor shall we discuss the reverse influence, as that of clinical epilepsy, upon the hypophysis, as in the studies of Munson at Craig Colony, or take time and space to consider the subjects of syncope and fainting in general. Even so simple a clinical observation as that of fainting probably has a very complicated and varied psychical and somatic mechanism. We do wish, however, to call attention to the fact that there is an increasing accumulation of clinical data of apparently idiopathic attacks of fainting without general somatic defect of the viscera. During the past few years several such cases have been referred to me on the suspicion that these individuals were suffering from a larval form of petit mal epilepsy.

We may enumerate briefly some of the salient differences between this special type of syncope and petit mal epilepsy. We must first note, however, that it is commonly stated that individuals who have their first attacks of petit mal are only suffering from a form of fainting dependent upon some dysfunctions of the viscera, a weak heart or indigestion. In other words, both laity and physicians are much more likely to believe that the early attacks of petit mal are but a form of syncope and in consequence of little moment.

As for real differential diagnosis: If there be no obvious or immediate exciting cause such as emotional stress or physical shock the individual attack of loss of consciousness is more likely to be nothing more than a syncopal one. Slow and incomplete loss of consciousness also is in favor of the state being simply that of fainting. While a sensation of faintness is common to both, usually it takes on much more elaborate characters such as are seen in the epigastric aura. This aura has the sensation of a rising of an indescribable numbing, burning or full feeling which reaches to the level of the chin, when consciousness is always lost in true epilepsy. In simple syncope frequently there is a sense of dizziness, palpitation in or about the heart, and, what is even more frequently encountered, a sinking uneasiness about the heart. When, however, there is no premonitory warning the diagnosis may be very confusing; under such circumstances one needs to think of the state as probable epilepsy, for less than a third of all epileptics have a warning of the approach of their convulsive seizures. In all syncope there is usually an absence of after-effects, which on the contrary are almost invariably present in epilepsy, such as malaise, mental hebitude and mental confusion. In epilepsy there is little pulse alteration, while this is common after pure syncopal attacks. In the absence of a sharp and distinct loss of consciousness one may look at the episodes as being purely syncopal. The presence of any degree of convulsive movement—independent, of course, of trembling from sheer weakness—marks the state as almost surely epilepsy as well as any transitory phenomena of automatism, sleep or stupor following the attack. Usually the syncope has so little to do with any phase of true vertigo that the absence of any part of the labyrinthian syndrome usually proves that the latter is playing no role in the state. While the classical types of continued syncopal attacks in dysfunctions of the hypophysis are not so often encountered in any large classical material the atypical instances of the states of fainting are perhaps more frequent. These atypical cases usually present themselves as follows: The general practitioner sees them in the rapidly growing boy or girl in late adolescence. There is a history of insufficient sleep and overindulgence in work, play or social functions. This adolescent has a history of having grown very fast—several inches in height at the puberty period—he is physically too large for his age but, as the eugenic law proves, however, he may be entitled to his extra height by comparing those of the parents; it is his too sudden acquirement of it that is pathological. The boy is soft in muscles, perhaps fatigues easily, may be extra awkward, shy or timid. As not infrequently happens he is rather dull in school-work. The latter defect shows the boy is concrete-minded; is restless and discontented with the school discipline; he wants to evade school duties and prefers an outdoor existence, although he cannot stand continuous outdoor activities without fatigue. Physically the patient also shows labile vasomotor changes; takes cold easily; has cold, dusky hands and feet and unexplainable periods of clammy sweats. Above all, when he gets up suddenly or is required to stand perfectly still he has vague or actual syncopal attacks. The clever physician after noting there is no real organic mischief in the boy's makeup cautions him against too intense physical training, etc., and dismisses the case. Perhaps the physician infers unwisely that the patient's nerves and blood need to be built up and prescribes accordingly. If these drugs are really potent considerable harm may be done, inasmuch as the youth needs neither more nor richer blood, nor does the nervous system need any stimulation, as the latter is already doing its best to quiet the youth by registering extra fatigue and compelling him to sleep long hours. The physician may wisely follow the main trends of compensation already indicated in the individual patient, that of more moderate but continuous outdoor activity and increased hours of sleep (some patients require twelve to fourteen hours to offset an ordinary day's activity), in which case those milder types never return for treatment. Occasionally, half-fearing the condition is epileptic in type, the physician gives sedatives. For a few days the youth appears better, then he returns, showing increased tendencies to syncopal attacks or he becomes very dull and exhausted. Even small doses of sedatives often produce definite toxic effects. On the patient's return for treatment the physician suspects he has prescribed an overdose of the remedy and either reduces it or takes it away entirely or resorts to additional blood and nerve tonics which seriously complicate the clinical picture. As yet the varied and complicated types of endocrine dysfunctions are so little known and described that the average physician little suspects the varied pictures which ductless gland imbalance may present, and many wait until later, when more pronounced types of the text-book descriptions are evolved. While in a real quandary what to do next the physician begins to sense that his patient has all sorts of things which are on the point of beginning, such as flat-foot, gastroptosis, crooked spine, constipation and skin disorders. Inferring that the youth is on the way to an early dissolution, everyone becomes alarmed. Then ensues a general round of visits to various specialists to do patchwork on the particular anatomical part each may find out of order. One of my patients was visiting six specialists, and his nervous invalidism was much encouraged by his narcissistic concern over these various treatments, which were limited to a half-dozen merely because time did not permit of more.

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[1] Read before the American Psychopathological Association, June, 1921.

Many of these slighter grades of hypophyseal dysfunctions cure themselves,[2] or, better, the other ductless glands cure hypophyseal imbalance by atrophy of the thyroid or excessive functioning of the adrenals, but often they do not do so until they have debauched many of the visceral organs in function or structure, or both. In the severe grades of this disorder something radically wrong is earlier recognized and succor follows more promptly if not less surely.

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[2] Apropos of this statement the following case may be cited: A young man, aged twenty-seven years, now under my care for a retarded depression, had grown very rapidly while attending a preparatory school between the ages of fourteen and sixteen years. He had a subnormal temperature (97.5° to 98°) the greater part of the time a low blood-pressure and slow pulse (60). He was "cold all the time," and for the greater part of two years he had syncopal attacks on the slightest physical shock, and finally had attacks quite independent of any apparent cause except when required to stand to be measured for a suit of clothing. These syncopal attacks left him weak and trembling. He was six feet tall at sixteen years. Under the advice of his physical trainer at school he engaged less actively in exercise, lived more in the open and took extra bed rest. No further therapy was followed and he recovered from the condition, the last symptoms to disappear being a moderate degree of flat-foot and a permanent acne. It is interesting to note that instead of being concrete-minded and a poor student, as in many of this class, he was the delight of his tutors and easily won several scholarships.

While in a single case one might preach a whole series of medical lessons of neglect in accurate diagnosis, once the disorder is diagnosed the therapy is not essentially simple—least of all is it to be met upon the basis of glandular therapy. While the latter helps, our method of administration is so crude that we must give the gland with caution. No glandular therapy at all is almost better unless due attention is paid to all the other principles of physio- and psychotherapy. In point of fact there are those who despair of ever finding so beautiful a sinecure of gland feeding for endocrinic dysfunction as thyroid administration in cretinism, and have preferred to assist their patients back to health without such aid. While this view is obviously empiric and not scientific it has much to recommend it. Let us see what is really at fault in our specific problem; First of all there is an enduring low blood-pressure and diminished sympathetic tone in the autonomic system. The viscera drains the blood from the cerebral cortex and syncope develops. Usually the adrenals and thyroids come to the rescue and reëstablish blood-pressure, and vasomotor and sympathetic tone are incompletely resumed to await the next calamitous period. As might be expected, all these individuals are underoxygenized. Their tissue metabolism is slow to build up and they are in a state of chronic organic fatigue requiring an enormous amount of sleep. Every case immediately improves with continuous outdoor living and long hours of sleep, but how are these principles to be made permanent in a changing organism during adolescence when the physical and mental equipment for life is to be met? Fortunately the imbalance is not stubborn of correction nor is the fixation once obtained needful of enduring care and attention. It would seem as though the system once having gained its imbalance fixated upon its normal adaptive routine and thereafter made the individuals aware of over-stepping the rules within healthful limits. The whole organism is trying its best to adjust to a plan of overgrowth for the time being. Different bodily functions seem to make an effort to catch up or compensate for the extra skeletal and muscular spurt. The sympathetic and vasomotor systems soon expand and take up their belated functions. One might term the state a form of irregular structural growth of the body, resulting in a disharmony of functioning on the part of the different systems. Three cases out of many that are fairly illustrative are here given:

CASE I.—A boy, now eighteen years old, came to me at the age of fourteen years with a record of poor schoolwork especially in all abstract studies; he was two years in arrears. He had fainting attacks at infrequent intervals when required to stand perfectly still. One of these occurred while being examined and was accompanied by profuse perspiration. He was nearly six feet in height, had low blood-pressure (92) and slow pulse (64). He possessed a childish type of physique—had soft muscles and a piping voice. His movements were slow and awkward. His development during adolescence followed the father's physical and mental history. He was decidedly lazy, sluggish and indifferent to any form of intensive effort. He fatigued easily and required an enormous amount of sleep (twelve hours). Bed-wetting was a permanent habit, and at the age of fourteen it still occurred once or twice a week. A concrete outdoor training was advised, with continued long hours of sleep and also special tutoring. After six months of such treatment the father reported the boy as physically well, and he is now making up his schoolwork, although by preference he prefers an industrial or business career to a professional one.

CASE II.—A young woman, aged twenty-nine years, who has a fairly normal personal and family history aside from a paternal uncle having a sort of "breakdown" in early life, which, judging from the description, may have been similar to our patient's disorder; he had a very large physique and was considerably over six feet tall. After he left indoor work and engaged in agricultural pursuits he enjoyed comparatively good health. Our patient was born at full term, was the first child, healthy and weighed about ten pounds. She is the largest in the family, although all the siblings, four in number, are large built. When about fourteen years of age she had sudden syncopal attacks which came on without cause except when she was required to stand quite still. Immediately following these attacks there would be loose evacuations from the bowels attended by colicky cramps in the abdomen. Soon after these digestive symptoms there would be a sense of fulness in the head and pressure in the ears. These syncopal attacks came on at the time of rapid growth, but were ascribed to indigestion and soon disappeared. The period developed normally at fourteen years. She attended to all her duties encountered in a small New England town and gained a good school education, being particularly proficient in mathematics. Her emotional life developed normally. She taught school for seven years and liked her work, but, as she said, it pulled her down physically and the summer vacations failed to fully restore her for the beginning work in the fall. She was at last obliged to give up teaching on this account and took up Y. W. C. A. work. However, even this type of indoor work proved too taxing, and the syncopal attacks again appeared but unaccompanied by the digestive symptoms. The present attacks come on without warning. She feels a coldness in the epigastrium and a sense of giddiness, which produces fright if she is alone, and she seeks to go to someone. If this is not possible she walks rapidly about, when the syncopal feeling passes off and she begins to feel tired all over. She believes she might faint if she did not move rapidly, although this apparently has never occurred. The attacks always occur by day, usually when she has been sitting or standing for some time. Her verbatim account of one of these is as follows: "I was feeling quite well when I got up. About nine o'clock I went to class and noticed my right hand was cold, but paid no attention to it. A few hours later I went to interview a teacher and found her busy, so I stepped into a room nearby and sat there alone waiting. Suddenly I experienced this sense of coldness, and I got up and walked toward a girl. I was about to attract her attention when I gained control of myself, although I did not feel natural. I was trembling, which is the usual effect after such a spell. There is never any abdominal sensation or indigestion now as formerly."

Physical examination shows a large physique; she is six feet tall. Her pulse was 60 to 64, blood-pressure, 87. There was a dermographism and rather markedly cyanosed hands. Otherwise the physical examination was negative. In the absence of the voice sign the character makeup and any mental stigma of epilepsy the condition was diagnosed as a pituitary dysfunction in which the muscle and skeletal growth apparently outran a proper nervous and circulatory development. There was a marked tendency to gastroptosis and flat-foot; the muscles were flabby and the bony frame was loosely put together. She was given postpituitary and thyroid, with the injunction that she live an outdoor life with long hours of sleep. Too short a period has elapsed to note the final outcome.

CASE III.—This is the case of a young woman, aged twenty-five years, who is nearly six feet in height, which she attained at an early age and whose description corresponds to the previous history as to low blood-pressure, slow pulse, etc. Her first syncopal attacks occurred during her thirteenth year, and were liable to occur on a sudden change of position, such as rising quickly from a chair or from a reclining position. When called on in school to recite or read from the blackboard on rising quickly a wave of darkness would come over her like a cloud before the eyes. It lasted less than a minute and seemed like a slight obstruction of the vision, accompanied by a pressure across the top of the head. There was no state of exhaustion following. During this time she had grown very rapidly and was chronically constipated. The syncopal attacks gradually disappeared after instituting a hygienic outdoor life in the country. Her tendency to such attacks has been overcome to the extent that she can now engage in indoor work without mishap, and is now taking a course in nursing.

Hardly any material may be found in the literature bearing directly upon our subject. For instance in Stier's work on *Syncopal Attacks*[3] he believes that the faintings are preceded by psychical states as precipitants—obviously a view illy in accord with our subject, wherein psychical factors play little or no role. Timme's[4] study, however, is more pertinent. His case material largely came under his purview because of extreme fatigability in adolescence and persistent headache. He makes no mention of fainting attacks, but otherwise outlines fairly sharply the physical characteristics of our material. He especially stresses the rapid growth, slow sexual maturity, vagatonia and low blood-pressure. In the final stages of middle life he states that petit mal may occur. His therapeutic suggestions are embraced largely in glandular feeding, and he does not seem concerned about detailing the process of compensation which nature uses in restoring the balance.

Summary. There are a number of rapidly growing adolescents who have relatively benign fainting attacks which at first seemingly simulate larval forms of petit mal epilepsy. They are to be differentiated from this latter condition by the absence of the epileptic character and the general physical and mental stigma of the grave disorder. The syncopal states are but a part of the obscure clinical picture of dispituitarism, in which there appears to be an excessive functioning of the anterior lobes of the pituitary gland. Coincident with the fainting attacks may be low blood-pressure, slow pulse, vasomotor ataxia and a host of defective muscular and skeletal displacements. In the psychical sphere one may encounter not infrequently character delinquencies and slow mental development. The line of corrective treatment is physical plus the administration of specific glandular substance. Mild cases recover of their own accord by gradually restoring the glandular and physical balance, but they can be materially helped by proper direction and rest. Timme states that in many cases of dispituitarism such as outlined in my paper the pituitary gland itself compensates by making some bony erosions and thus enlarges the sella for the proper functioning of this gland, and that this fact can be demonstrated by the roentgen ray. In my own cases the roentgen-ray examinations were uncertain of exact determination of this fact.

From the evidence in this brief paper one gains the fact that even in the large group of essential epilepsies and the psychoneuroses in which endocrine dysfunctions are present one must not charge too surely the dysfunction as a real but only a contributing cause for the nervous disorder, for many other precipitants of the disease are surely in evidence which are much more nearly related to the psychic disorder than the circumstance of an endocrinic disturbance. By assuming this position our special glandular therapy will not be too heavily charged with remissness when its administration solely results in failure. No two disorders existent in the same individual are essentially in the relationship of cause and effect.

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[3] Syncopal Attacks, Especially among Children, Deutsch. med. Wchnschr., April 8, 1920.

[4] A New Pluriglandular Compensatory Syndrome, Endocrinology, 1918, 2, 209.

THE UREA CONCENTRATION TEST.

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The object of this paper is to compare the merits of the urea concentration test with some of the more common tests for kidney function.

The relation of kidney pathology to hypertension has been an extremely interesting and perplexing problem, especially the degree of renal involvement generally found in cases of hypertension, just how much latitude is allowable to the term 'essential hypertension" and whether or not cases of hypertension exist for any appreciable length of time without some demonstrable abnormality in kidney function. Consequently when the work was started, some sixteen months ago, I had in mind the establishment of a routine method, or methods, of examination which would throw some light on the above stated questions.

The number of cases has been limited and the methods of technic were changed frequently in the beginning, therefore the results obtained from the work have been rather disappointing. However, a preliminary report will be given.

I was especially interested in the article by MacLean and De Wesselow,[1] in which they discuss the effects of "war nephritis." They conclude that patients with defective kidneys are unable, after receiving a large dose of urea, to excrete urine with a very high concentration of urea. Further, that the degree of concentration seems to bear a direct relation to the degree of kidney involvement.

The details of the test are as follows:

The patient urinates and at once takes 15 gm. of urea dissolved in 100 cc of water.. One hour after taking the urea the patient voids. Two hours after taking the urea the patient again voids. The percentage of urea is calculated in both specimens. If the percentage

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[1] Quart. Jour. Med., July, 1919.